

## SHAPE-INTRINSIC WATERMARKS FOR 3-D SOLIDS

## ABSTRACT OF THE DISCLOSURE

Umbilics of two surfaces are compared and it is determined from this comparison whether the suspect surface is a copy of the original surface based on the comparison. Comparing umbilics includes determining whether locations of the umbilics of the suspect surface match within a specified margin umbilics of the original surface, and determining whether pattern types of umbilics of the suspect surface match pattern types of corresponding umbilics of the original surface. A “weak” test may be performed, in which corresponding points on the two surfaces are compared, wherein the comparison of umbilics is performed if corresponding points of the two surfaces are located within a specified margin of each other. The points may be gridpoints on wireframes, which in turn may be based on lines of curvature of the surfaces. Comparing umbilics is performed if it is determined that each surface has at least one umbilic. Further still, an “intermediate” test may be performed which includes, for each surface, computing the principal directions of lines of curvature at each grid point. The computed directions of lines of curvature for corresponding gridpoints on the surfaces are compared. A determination is made as to whether the suspect surface is a copy of the original surface, based on the comparison.